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November 29, 1958

VOL. 74 NO. 22 PAGES 337-352

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Chemical Cover

See page 343

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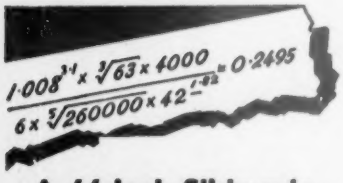

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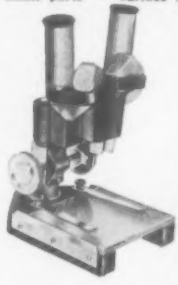

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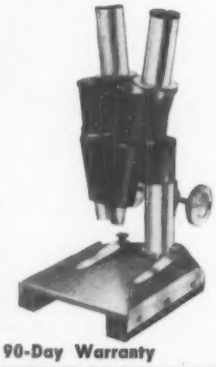

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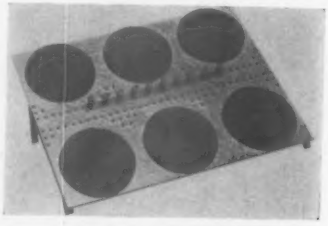

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ASTRONAUTICS

Study Space Effects

Studies being carried on now are providing scientists with information essential to preparing man to survive a possible future trip through space.

➤ THE SPACE traveler probably will not be able to see his dentist twice a year. This means that any special dental problems arising on a trip to the planets will have to be solved here on earth.

Fortunately, however, the atomic-powered submarine and the International Geophysical Year have both given dentists the opportunity to solve some of the problems before putting a man into space, Capt. William R. Stanmeyer of the U.S. Navy reported.

Information from these two sources is being gathered and compared. Many of the conditions of space travel such as isolation and extreme cold are duplicated in submarines and at IGY research stations.

The over-all study is called the "eflect of stresses of an unnatural environment on oral health," Capt. Stanmeyer told scientists at the Association of Military Surgeons of the United States meeting in Washington.

So far several important discoveries have been made.

Acting on complaints of the crew of an A-powered submarine, scientists found that Freon had been escaping from the air conditioning system. Although the amount of Freon was below tolerance levels, the men had complained of burning lips and mouth linings.

It was discovered that at comparatively low temperatures (300 to 500 degrees Fahrenheit) Freon breaks down into hydrogen fluoride gas and hydrogen chloride gas. When these gases dissolved in the moist mouth, strong acids were formed that irritated the mucous membranes. Now, Capt. Stanmeyer reported, all joints in air conditioning systems are welded to prevent Freon escape.

Other studies indicate that possibly persons exposed to an atmosphere containing an increased carbon dioxide content should be "degassed" just as a diver is. This would mean gradual exposure to air richer in oxygen until the individual is again breathing normal room air.

There was an "alarming increase" in gingivitis, inflammation of the gums and mouth lining, and almost a 100% increase in cavities among submarine crews living mostly in a closed environment. The reason for this is not yet known, Capt. Stanmeyer said.

In addition to the need for maintaining oral health, the dentist has another important role, the scientist said. Examination of the teeth and soft tissues can tell much about a man's health form age six to the present, even indicating certain mental and emotional characteristics.

Even if the space traveler eats capsule meals where teeth are not needed, there will be the dental problem of preventing trouble through the "atrophy of disuse," Capt. Stanmeyer said.

➤ WHEN MAN goes shooting off into space, with the moon or other planets as his destination, he may find that he can survive best by lying down on the job.

Recent research has shown that man can stand greater and longer periods of accelerative force when he is "semi-supine," Dr. George Kitzes of the Wright Air Development Center told a space flight panel meeting.

Normally the human body is accustomed to the gravitation stress of one g at sea level. However, Dr. Kitzes said, peaks of 8 g to 9 g were tolerated for the first stage of a make-believe three-stage space missile; 5.6 g was tolerated for each of the other two stages. A majority of the test subjects could stand 3 g for as long as one hour, and 9 to 10 g for from 30 seconds to one minute.

Tests were conducted succesfully with the accelerative force applied to the subject from front to back, at right angles to the long axis of the body, Dr. Kitzes explained to the panel, which was part of the meeting of the Association of Military Surgeons of the United States.

INFORMATION STORE — A network of magnetic "pins" the size of a cigarette package, tested here by D. A. Meier, is said to be able to store 8,000 "bits" of information.

Noise and vibration are two other potential health hazards being studied at the Development Center's Aero Medical Laboratory, he said. It has been reported that the noise level of a rocket launching may be as high as 120 to 140 decibels. Sound at 100 decibels has been known to cause pain in man.

So far vertical accelerator studies at the Laboratory indicate there are no critical problems here. However, the scope of vibration during launching or re-entry still needs to be clearly defined, Dr. Kitzes said.

Considering only the physiological, psychological and protection requirements of manned space flight in his discussion, Dr. Kitzes summarized some of the results of recent research. Eventually, he explained, a closed system will be designed to provide complete regeneration and reclamation of all gaseous, liquid and solid materials needed and utilized in normal human metabolism.

The tremendous variability among persons in their ability to endure isolation and confinement will also be an important consideration in space flight. One individual was able to stay seven days in a completely dark, soundproof room without organized or planned activity. An equally willing volunteer gave up after 20 hours.

Concerning the problem of temperatures, Dr. Kitzes pointed out that test subjects have tolerated temperatures of 150 degrees Fahrenheit for five minutes or less. This may allow for the high temperature expected during re-entry of the space vehicle into the earth's atmosphere.

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ENGINEERING

Magnetic "Pin" Speeds Computers 10-20 Times

➤ A MAGNETIC device smaller than a common pin is expected to increase the "thinking" speed of future electronic computers 10 to 20 times.

Developed under the direction of D. A. Meier, research scientist of the National Cash Register Company's electronics division, the new magnetic glass rod serves as both a switching and information storage element.

The rod can switch electrical current at a speed of one 250-millionths of a second, faster than any known switching device, Robert G. Chollar, research vice president of the Company said.

It would also require much less power to operate than existing memory components. A network of 5,000 rods could operate simultaneously on the energy needed to light a 100-watt bulb.

In addition to boosting the "thinking" speed of data processors, Mr. Chollar said, the pin-sized device would increase the reliability of computers as well as reduce the amount of equipment needed to work on a problem. An electrical charge of only a 20-thousandths of a watt is needed to store one "bit" of information on the rod.

It should also enable space vehicles to navigate with a smaller power supply and increase their range.

Science News Letter, November 29, 1958

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

➤ **Psychologia Animal.**—Scientistas al Universitate California ha trovate que rattos con alte grados de intelligentia habeva plus alte nivellos de activitate de cholinesterase in le cerebro que rattos con basse grados de intelligentia. Experimentos genetic provava que le relation inter intelligentia e cholinesterase non es simplemente linear. Le scientistas in question specula que le factor a studiar in iste connexion es possibilemente le balancia inter cholinesterase e acetylcholina plus tosto que le concentration de cholinesterase per se.

➤ **Astrobiologia.**—Le conviction del famose astronomo Dr. Harlow Shapley que il existe al minus cento milliones corpores celeste capace a supportar un forma de vita non fundamentalmente differente del nostre esseva citate per le chimico Dr. Melvin Calvin in un conferentia in que ille disveloppava le idea que le vita es un factor generalmente cosmic e non un accidente trivial que interessa solmente un sol planeta de dimensiones absolutemente negligibile. Si le vita—specificamente le vita human—ha alterate le character del terra, plus profunde effectos del vita pote (e debe) esser supponite in le caso de altere corpores celeste.

➤ **Dentisteria.**—On estima que in americanos de plus que 35 annos de etate, morbos periodontal—i.e. morbos non del dentes mesme sed del structuras que supporta le dentes—resulta in extractiones cinque vices plus frequente que illos casuate per carie dental.

➤ **Contamination Radioactive.**—Cornos de cervos pare esser un excellente base pro mesurationes del contamination del terra per precipitate particulas radioactive. Duo scientistás de Glasgow in Scotia ha mesurate le radioactivitate de strontium 89 e strontium 90 in le cornos de un cervo occidite in 1952 e de un altere occidite in 1957. Un crescentia decuple del radioactivitate de strontium esseva assi constatate pro le mentionate intervallo cinquenne. In 1952, ille radioactivate amontava a 11,2 micro-microcuries per g de calcium; in 1957, a 126. Un tenue section del corno de 1957 produceva un clar autoradiogramma. Nulle tal esseva obtenibile ab le specimen de 1952.

Astronavigation.—On sape que algas ha un rolo importante in omne speculationes relative al "claudite systema de alimentation" in futur naves de viage cosmic. On ha proponite considerar le possibilitate de variar le dieta del futur astronautas per includer animales algivore in le cyclo del systema. Assi on poterea promitter al astronautas, post lor suppa de algas, un dessert de limaces.

➤ **Statistica Medical.**—In comparar le statistica medical de 1957 con illo de 1952 in le Statos Unite, on ha constatate (1) marcate reductiones del incidentia de diphtheria, encephalitis, hepatitis, malaria, poliomyelitis, trichinosis, tuberculose, e febre typhoide, (2) nulle alteration significative in le incidentia de dysenteria, febre rheumatic, tetano, infection meningococcal, e morbos veneree, e (3) un marcate augmento del infectiones streptococcal e de amebiasis—amontante a quasi 100 pro cento in le prime e a 36 pro cento in le secunde caso.

➤ **Radiation Ionisante.**—Esseva calculate que un pilota qui vola 1000 horas per anno a un altitude de 10 km recipe un irradiation "natural" de approximativemente duo vices le quantitate que es normal al superficie del terra. Pilotas volante tante horas a tal altitudes va devenir de plus in plus numerose con le disveloppamento del aviation commercial a motores de reaction. Le mentionate augmento de irradiation—attingente forsan 250 millirad—esserea ancora multo infra le maximo permissible, secundo le currente conceptiones.

➤ **Physiologia del Sensos.**—In excidite oculos animal, le generation de micrissime amontas de electricitate esseva constatate in le presentia de un forte stimulo luminar. Le experimentos ducente a iste constatation esseva effectuate al Universitate Ohio como parte de un investigation general del mechanismos biophysic de omne le "cinque" sensos.

➤ **Antibioticos.**—Al Hospital St. Mary's a London on ha trovate que le penicillinas—specialmente le penicillinas a action relentate—perde progressivemente lor efficacia contra le organismos que es la causa de gonorrhea. Iste organismos es cognoscite como gonococcos. In recente tests, le gonococcos se provava penicillinoresistente in 9,8 pro cento del patientes negre e in 5,6 pro cento del patientes de racias blanc.

➤ **Television.**—Le Compania General Electric ha perfectionate un camera de television capace a obtener clar imagines in le presentia de un lumine si debile que le oculo human, con su adjuta, vide solmente le plus vage contornos. Un incende-cigarrettas in un satis grande sala es typic como exemplo. (Iste disveloppamento ha nihil a facer con le uso de lumine infrarubie in le prension de imagines de television.)

➤ **Chirurgia Plastic.**—Al Universitate Wisconsin, reconstruction de punctas del naso ha essite effectuate con graffos prendite ab le lobos auricular. In graffos destinate a esser implantate in le naso, le obvie desideratos include absentia de capillos e similitude de color. Le lobos del aure (del patiente mesme) es ideal in ambe iste respectos.

➤ **Antibioticos.**—Le effcacia del antibiotico bacitracina es augmentate—in certe casos mesmo quadruplicate—per le addition de zinc. Iste constatation esseva facite per recercatores al Universitate Indiana. Bacitracina es usate in combatter infectiones sed principalmente in promover le crescentia de bestial de consumo.

➤ **Antibioticos.**—Un nove antibiotico—preste a esser lanceate al mercato sub le nomine de vancomycina—es promittentissime in le lucta contra infectiones staphylococcal. In extense tests, nulle caso esseva trovate in que staphylococcos habeva devenite resistente a vancomycina. Le base del nove agente es un mucor trovate al interior de Borneo.

➤ **Intoxication Alcoholic.**—Le Committee pro Problemas Medicolegal intra le Association American Medical reporta su recommendation que un individuo deberea esser considerate como intoxicate si le contento de alcohol in su sanguine excede 0,15 pro cento. Le committee etiam recommenda que un contento de alcohol de minus que 0,05 pro cento in le sanguine deberea esser ignorate ab le puncto de vista medicolegal. Iste e altere recommendationes es basate super investigationes que ha monstrate que le quantitate de alcohol consumite e mesmo le relation inter iste quantitate e le massa del corpore del subjecto in question non determina su intoxication. Le sol factor importante in iste respecto es le absorption de alcohol in le sanguine. Nunc, iste factor varia grandemente ab un individuo al proxime, sed—del altere latere—un facto multo suprendente que esseva establite per le committee es que practicamente le mesme concentration de alcohol in le sanguine es responsible pro le mesme grado de intoxication in diverse subjectos.

➤ **Ingenieria.**—Nove Zelanda ha in servicio su prime installation de generation electrodynamic que utilisa le energia de geysers natural.

Science News Letter, November 29, 1958

GENERAL SCIENCE

Reading Interlingua

➤ YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you had never had contact with any foreign language.

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CHEMISTRY

Organic Solar Battery

Development of the first organic solar battery holds the promise of man's being able to duplicate the living plants' efficient conversion of solar energy to chemical energy.

➤ DEVELOPMENT of first organic solar battery has been reported at the University of California.

David Kearns, graduate student, and Dr. Melvin Calvin, photosynthesis expert, report in the *Journal of Chemical Physics* (Oct.) that they have achieved a solar battery effect in a cell containing alternate layers of organic dyes.

Efficiency is extremely low. However, dyes, synthesized from coal and petroleum, are inexpensive and there is an almost unlimited variety to choose from.

Work grew out of investigation of the mystery of how plants store sunlight in energy-bearing compounds. Scientists long have known that the light is captured by chlorophyll, the green pigment found in bits of plant cells called chloroplasts.

Recently, scientists have shown that the chloroplasts have a quasi-crystalline structure with alternate layers of fat, protein, and chlorophyll. Dr. Calvin believed this looked structurally like the silicon photobattery cell, and he and Mr. Kearns began their research.

They press the dyes into tiny wafers three-eighths of an inch in diameter and one-sixteenth of an inch thick. These multicolored wafers are then placed in alternate layers in a cell. When illuminated, the laminated unit yields an electrical current, showing that the cell converts sunlight into electricity.

Two dyes that have worked are phthalocyanine, a distant chemical cousin of chlorophyll, and phenylenediamine.

Currently the scientists are trying some of the large number of conducting organic dyes, in different colors of light and temperatures, factors that affect efficiency.

The scientists could not speculate on the cost of development of efficient organic solar batteries, since the work is in its early experimental stages. However, perfection of structure, which makes silicon solar batteries expensive and difficult, may not be necessary with the dyes.

Organic solar batteries someday may be important in space flight, for satellites and for specialized uses on earth.

Also observation on the macro scale of a photobattery effect that in photosynthesis occurs only on an unobservable micro scale is important in understanding this basic process of life.

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PUBLIC HEALTH

Suggest Radiocarbon Harmful as Fallout

➤ RADIATION from carbon-14, a by-product of nuclear testing previously believed insignificant from a health standpoint, may be potentially more harmful than that of any fallout material.

Dr. Linus Pauling, Nobel Prize-winning chemist of the California Institute of Technology, Pasadena, said he was "surprised" to find that the genetic effects of carbon-14 may be so great.

Carbon-14 is formed when neutrons from the test explosions react with nitrogen atoms in the air. It is longer-lasting than most products of the bombs, having a 5,600-year half-life (the time taken for its radioactivity to be reduced by half).

Dr. Pauling estimates in *Science* (Nov. 14) that one year of nuclear testing produces sufficient carbon-14 to cause a total "of about 55,000 children with gross physical or mental defects, 170,000 stillbirths and childhood deaths, and 425,000 embryonic and neonatal deaths" during the next 10,000 years or so.

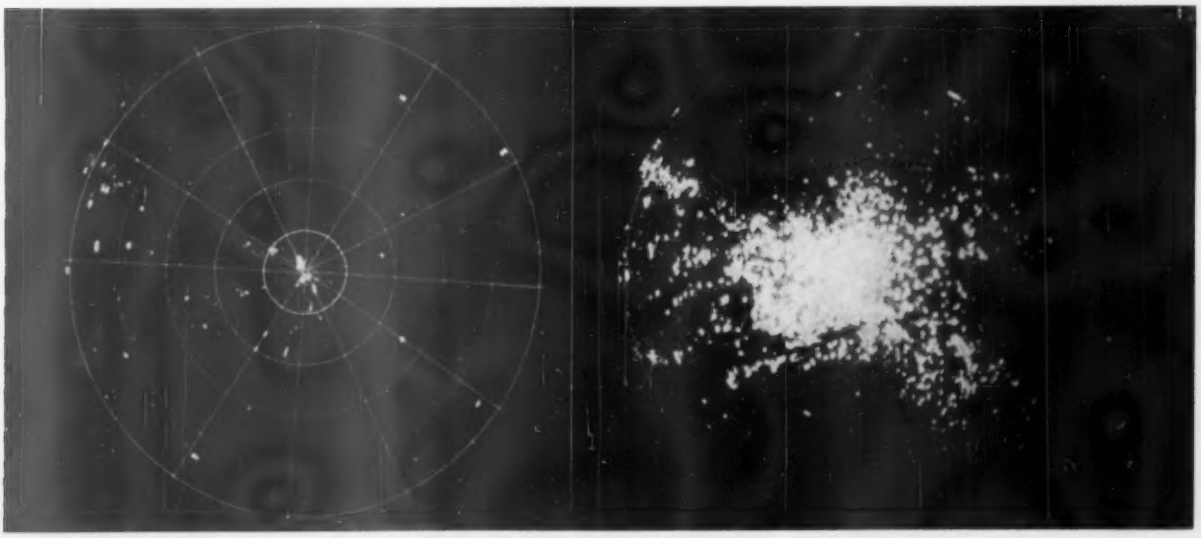
These numbers, he says, "are about 17 times the numbers usually estimated as the probable effects of the fallout fission products from one year of testing."

He cautioned that his calculations are subject to great uncertainty and they may be anywhere from five times too high to five times too low. His estimates are based on a future birth rate five times above the present one and they contain an unknown amount of overlap in the three categories of damage.

The total number of cases of leukemia and bone cancer expected to be caused by carbon-14, Dr. Pauling estimated on the basis of certain assumptions, is about equal to that estimated for fission products.

His conclusions are similar to those of a recent Atomic Energy Commission report. Dr. Pauling, whose controversy with the AEC over the possible potential damage as a result of the bomb test has been widely publicized, told SCIENCE SERVICE that there "does not seem to be any disagreement any more."

Science News Letter, November 29, 1958



ANGELS—Radar scope "angels," spots that seem to be reflections of the radar beam from points in the sky where nothing can be seen visually, have been identified as seagulls and other birds. The photographs at the left shows a radar scope at Cape Cod, Mass., to which a bird-removing circuit was applied by Lincoln Laboratory scientists at Massachusetts Institute of Technology. The other photograph was taken 24 seconds later, without the bird-removing circuit in operation. Each dot represents one bird.

PUBLIC HEALTH

Study Air Pollution

➤ NEITHER rain, storm, snow nor sleet keeps the British postman from the completion of his daily rounds, but air pollution does.

Health records of mailmen in Britain indicate there is a "very significant correlation between visible fog and sickness absence and 'bronchitis wastage' (by which is meant mailmen dying in service, or prematurely retired, from chronic bronchitis)," Dr. Geoffrey C. Carey reported.

A seven-year study of postal workers showed the pneumonia and bronchitis rates for an indoor worker was comparable to that of an outdoor mailman 20 years younger, Dr. Carey told the National Conference on Air Pollution meeting in Washington.

The scientist, a member of the department of preventive medicine and industrial hygiene, University of Cincinnati, said that a study of some 200 chronic bronchitis patients also gives evidence of a relationship between air pollution and sickness. The patients tend to feel worse immediately before the onset of visible fog. Furthermore their symptoms increase and decrease in exactly the same pattern as do simultaneous measurements of smoke and sulfur dioxide. Other studies, especially a long-term follow-up study of the sickness records about 700 school children grouped according to their places of residence, are being carried out to study the effects of air pollution.

While it is difficult to compare the air pollution problem in the United States and Britain—pollution levels in a typical American city are only one-tenth those in London—there are some similarities, Dr. Carey said. Chronic bronchitis sufferers in this country also exhibit a worsening of symptoms with increases in air pollution.

Other scientists at the Conference, reporting on the health effects of air pollution, pointed to research implicating polluted air as a possible factor in emphysema, lung cancer and other diseases of the respiratory system. However, much of the research is still in the early stages and the relationship between effects observed in animals and diseases in man needs further study, they said.

Science News Letter, November 29, 1958

METEOROLOGY

Radar Helps Weathermen

➤ PROGRESS in efforts to improve very short-range forecasts of the ceiling and visibility at airports was reported at a weather radar conference meeting in Miami Beach.

Sudden changes in visibility can endanger descending aircraft. Reliable reports of visibility during the next few minutes are especially important when jet aircraft are being landed.

Radar observations of rainfall may be helpful in forecasting the sudden changes, Prof. James M. Austin and Morton Glass of Massachusetts Institute of Technology have found. They and other M.I.T. meteorologists have been studying the problem with the help of a device that integrates and corrects the information appearing on a radar scope about precipitation.

This electronic apparatus, developed at M.I.T., is called an iso-echo contouring device. The radar weather observer who uses it receives a more complete and up-to-the-minute picture of the contours of a storm than he is likely to be able to piece together from ground observers' reports. Many more rain-gauge readings than are normally available would be needed to give a forecaster as good a picture as this apparatus produces on the radar scope of the area covered, the intensity and the duration of precipitation.

The extent to which radar observations may be applied successfully to short-range forecasting depends not only upon the relationship of ceiling and visibility to rainfall, but also upon the predictability of the radar patterns themselves. Dr. Aaron Fleisher and Thomas M. Noel of M.I.T. have been using an IBM-704 electronic computer to study the feasibility of predicting the rainfall patterns as seen by radar.

At the same time, Prof. Austin's wife, Dr. Pauline M. Austin, and Mrs. Dorothy Berry have been using the iso-echo contouring device to study small storms that occur within the area encompassed by a large storm. Their research has indicated the variations within storms should be considered both in investigations of the effects of rainfall on the surrounding atmosphere and in studies of the formation of precipitation.

The radar weather work at M.I.T. has been supported by the Army, Navy and Air Force, and was described during a conference sponsored jointly by the radar meteorology committee of the American Meteorological Society and the radar meteorological section of the University of Miami Marine Laboratory.

Science News Letter, November 29, 1958

● RADIO

Saturday, Dec. 6, 1958, 1:35-1:50 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Dr. S. Fred Singer, professor of physics, University of Maryland, College Park, Md., will discuss "Radiation Menace in Space."

ASTRONAUTICS

Men Survive High Oxygen

➤ SIX MEN have spent seven days in a compartment containing more than two and a half times normal oxygen concentration with little ill effect.

This was disclosed by Capt. Charles F. Gell of the Office of Naval Research at the American Rocket Society meeting in New York. Dr. Gell's experiment was prompted by the lack of unanimity of opinion regarding the maximum oxygen percentage to which humans could safely be subjected.

All the men experienced a reduction in vital lung capacity (maximum amount of air that can be exhaled after a maximum inhalation), and two showed signs of a slight oxygen toxicity.

The compartment involved was a low-pressure chamber measuring 11 by six by seven feet, fitted with bunks, toilet, sink, and a water bath for heating K rations. Window ports were fitted with polarized glass so that the men could not look out but observers could look in.

The oxygen pressure within the chamber was kept at 418 millimeters of mercury and the nitrogen pressure at 103 millimeters. This compares with 152 millimeters and 608 millimeters, respectively, in normal atmosphere at sea level. In other words, oxygen comprised 55% of the test atmosphere, whereas it comprises 20% of normal atmosphere. Carbon dioxide was kept to a minimum by the use of absorbents.

Blood and X-ray studies were made immediately before and after the experiment, and daily urine samples, pulse readings, and chest expansion and vital capacity measurements were also taken.

Psychological performance tests were piped in on tape. Nine and a half hours each day were devoted to testing, eight hours to sleep and the remainder to leisure time. At any given time two men were always sleeping, three were working and one was idle.

From a psychological point of view, said Dr. Gell, the men were in satisfactory shape at the end of the run and there was no evidence of undue stress. The men performed well and remained companionable. However, toward the end of the experiment, they complained about the monotony of the food and the disturbing odors in the chamber as a result of confinement.

The reduction of vital capacity noted was due to folding up of the alveolar air sacs of the lungs. This might have been because at that high an oxygen level a large lung area is not required.

It might also indicate that some inert gas, such as nitrogen, is needed to keep the alveoli distended.

The main result of the experiment, said Dr. Gell, is that this concentration of oxygen is probably the very top limit, for this particular set of circumstances, to which man can be safely subjected over a prolonged period of time. With good training, discipline and high motivation, men can probably tolerate confinement similar to that expected in a space flight of at least seven days.

The experiment was carried out at the Navy's Air Crew Equipment Laboratory at the Naval Air Material Center in Philadelphia.

Science News Letter, November 29, 1958

ASTRONAUTICS

Mice Survive Re-Entry

➤ THE TALE of Laska and Benjy, the two mice sent aloft into space last summer in the nose cones of two-stage ballistic missiles, has its sequel in the first full scale report of Project MIA (Mouse In Able) presented at the American Rocket Society meeting in New York.

The two mice were rocketed to a higher altitude, about 1,400 miles, than that reached by any other living organism. The Russian Sputnik II, containing the dog Laika, reached an apogee of 1,050 miles.

Project MIA was planned in conjunction with the Project Able re-entry test program and in each of the three Able flights one mouse was carried in the nose cone. The first, however, carried an uninstrumented mouse and therefore no data were gathered. The second carried Laska and the third Benjy.

The experiences of Laska and Benjy were described in a report to the Society by Miss Franki L. van der Wal and W. D. Young of Space Technology Laboratories in Los Angeles.

Neither of the mice was recovered, but there is every indication that they would have been found alive if the nose cones had been retrieved. Evidence shows that the last data points were received from Laska when the nose cone was suspended from the recovery parachute. If this is so, the mouse survived all the major stresses associated with the re-entry recovery operations, and returned to sea level alive after approximately 40 minutes of weightlessness.

Although no generalized conclusions regarding the behavior of mice in space may be drawn from Project MIA, some interesting observations were made. Take-off conditions were found to be not severe enough to produce any violent or continuing response from the mice. Furthermore, no evidence of distress due to weightlessness was noted in either flight.

Laska's heart rate increased fairly steadily with increasing acceleration load and began to drop slowly at first-stage burnout.

While the decrease in Laska's heart rate at burnout of the first rocket stage was gradual, at second-stage burnout it was sharp. No trend was detectable in Benjy's heart rate at first-stage burnout, but a distinct increase was apparent at the beginning of weightlessness.

A detailed description of equipment and instrumentation development for the project was also contained in the report. Instruments designed to detect biological reactions were so delicate that electrodes measuring heart rate had to be attached to each mouse's thorax by intricate surgical means.

Science News Letter, November 29, 1958

CONSERVATION

Hexadecanol Useful In Controlling Water Loss

See Front Cover

➤ REDUCING evaporation from fresh water lakes, streams and reservoirs could save the United States millions of acre-feet of water.

Use of hexadecanol is a possible solution to the evaporation problem, Floyd E. Dominy, associate commissioner of reclamation, Department of the Interior, told the National Reclamation Association meeting in Houston, Texas.

The light covered area in the upper left of the photograph on the cover of this week's SCIENCE NEWS LETTER has been covered with a one-molecule thick layer of hexadecanol. The wake of the dispenser boat with a dark line separating the output of the two nozzles is visible on the right edge of the covered area.

Science News Letter, November 29, 1958

EDUCATION

National Academy Offers Science Study Aid

➤ IN RESPONSE to the demand for information related to the International Geophysical Year activities, "Planet Earth" has been designed and produced as a dramatic and colorful supplement to school textbooks. A well-illustrated booklet for students describes specialized scientific work in a dozen or so fields. Classroom experiments, teaching suggestions, background material and information on science scholarships are included in a teacher's kit. Six full-color posters, each three feet by four feet, represent six fields of study: the earth, the oceans, the poles, the sun and earth, weather and climate, and space.

"Planet Earth" was produced under the direction of Dr. Hugh Odishaw, executive director of the U. S. National Committee for IGY, with the assistance and advice of scientists, educators, designers and artists. The project was supported financially by the National Science Foundation and the Ford Foundation.

The materials are available at cost from the National Academy of Sciences Publications Office, Washington, D.C. A classroom package of six posters, 30 student brochures and a teacher's kit may be ordered for $9.50. Poster sets, students' brochures and project leaders' kits also may be purchased individually at $5.75, 50¢ and 75¢ respectively.

Science News Letter, November 29, 1958

ROCKETS AND MISSILES

Blows Soap Bubbles To Study Combustion

➤ BURNING GASES inside huge soap bubbles may help designers of rockets and jet engines learn why propellants frequently burn unevenly.

Such irregular combustion, said William A. Strauss of the Ohio State University Rocket Research Laboratory, Columbus, sometimes causes a portion of the propellant not to burn. Particles of unburned fuel could then accumulate, heat up and detonate, destroying the entire rocket chamber. The instability could also cause loss of propellant particles with the exhaust, resulting in poor performance.

Mr. Strauss is trying to determine the effect of pressure on the burning velocity of gas mixtures at pressures up to 1,500 pounds per square inch. The soap bubbles, which are in reality composed of glycerine and detergent and are about the size of tennis balls, are blown inside an 11-foot-long chamber in which the air pressure has been built up to about 1,500 pounds per square inch.

The gas explosive mixture is eased under pressure into an injector. The soapy solution on the injector tip is then blown to form a bubble and two electrodes are pushed to make a contact. When the gas mixture is ignited, the combustion begins in the center of the bubble and continues evenly outward in all directions until the walls are consumed in flame.

Mr. Strauss' research is being conducted for the U. S. Air Force on a contract with the university's Research Foundation.

Science News Letter, November 29, 1958

PHYSIOLOGY

Cerebrospinal Fluid, Nervous Disorder Linked

➤ A POSSIBLE key to the malfunctioning of the central nervous system has been discovered in the cerebrospinal fluid.

Further analysis of the cerebrospinal fluid's chemistry may point the way to reversing the metabolic process involved in schizophrenia.

This water-clear fluid which circulates in some of the spaces of the brain and the spinal cord contains excessive amounts of "protease" and "vasodilator polypeptides" in persons with diseases of the central nervous system, Drs. Loring F. Chapman and Harold G. Wolff of New York Hospital-Cornell Medical Center, New York, report in *Science* (Nov. 14).

Accumulation of these substances in excess can result in damage to tissue that may in turn interfere with the "functional capacity of the central nervous system." When there is a need for getting increased nutrients to the tissues, extra amounts of the protein-breaking-down enzyme protease are helpful. Otherwise the protease and the polypeptides it forms as a result of protein-break-down can be dangerous.

Analysis of the cerebrospinal fluid from patients, including those with central nervous system diseases, chronic schizophrenia and vascular headache of the migraine type, showed it had properties similar to polypeptides—simple non-protein combinations of several amino-acid molecules—that cause dilation or expansion of the blood vessels. The scientists report that fluid from those persons with either inactive disease or none at all gave negative results when tested for its capacity to contract involuntary or smooth muscle.

It is of special interest, Drs. Chapman and Wolff point out, that the cerebrospinal fluid of schizophrenics contains an abnormal amount of protease.

"This observation suggests that a significant (yet perhaps reversible) alteration in metabolism occurs in the brain of patients with schizophrenia," they say.

Whether or not the accumulation of protease and polypeptides is a cause or a result of the brain's deranged metabolic function, it seems this accumulation could contribute to impairment of the brain's functions, the scientists conclude.

Science News Letter, November 29, 1958

ASTRONAUTICS

"Sweeping Satellite" Could Clear Path

➤ A "SWEEPING SATELLITE" that would gather the cosmic particles and clear a channel through the earth's radiation belt has been suggested.

The satellite would act as a gatherer of cosmic particles, Dr. S. F. Singer, University of Maryland, explained at the international space symposium meeting in San Antonio, Tex.

According to Dr. Singer, there are two radiation belts that must be penetrated by space vehicles. One is the "soft" belt composed of particles of solar origin. The space vehicle, and eventually man, can be shielded from these particles by a lead coating of a few millimeters in thickness.

The "hard" belt, or cosmic particles, however, could penetrate a shield, according to Dr. Singer's theory of radiation.

The shielding problems for these particles are severe. Large thicknesses of material are needed to reduce the radiation level to a tolerable level. Therefore, it might be more promising to reduce the radiation belt intensities by eliminating the particles, he suggested.

This reduction could be accomplished by operating a satellite that would "sweep" the space around the earth by absorbing the particles as they hit it.

If one satellite with a radius of about 30 meters were used, it would take one year to gather particles. If 12 satellites of the same size were used, it would take one month to reduce cosmic radiation to a safer level.

In addition, Dr. Singer's radiation theory indicates that the polar regions would be the preferred location for interplanetary launchings since these regions are believed to be free of the hard or cosmic radiation belt.

Science News Letter, November 29, 1958

IN SCIEN

ENDOCRINOLOGY

Parathyroid Protects Against Radiation

➤ PARATHYROID extract can increase survival following irradiation by more than 50%.

For rats that received two milliliters of parathyroid extract either before or after irradiation, the survival percentage was significantly higher than in rats injected with a saline solution, R. H. Rixon, J. F. Whitfield and T. Youdale of the Atomic Energy of Canada, Ltd., Chalk River, report in *Nature* (Nov. 15).

When the extract was administered before irradiation, survival was 81.5% compared with 52.9% in the rats receiving saline. Survival declined when the treatment was given after irradiation, but was higher (66.7%) in rats given parathyroid extract than in the saline group (21.4%). The reason for the large survival difference between pre- and post-treatment for rats in the saline group is "not clear," the scientists report. A much greater proportion of gastrointestinal hemorrhage occurred in rats injected after irradiation, however.

Experiments are being conducted to learn if the parathyroid hormone's ability to increase serum calcium is responsible for the extract's protective powers, or if some other factor is at work.

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METEOROLOGY

Doppler Radar Spots Tornadoes

➤ EXPERIMENTAL radar equipment is being used to spot tornadoes in time to give threatened areas sufficient warning.

Described at the Seventh Weather Radar Conference of the American Meteorological Society, Miami Beach, the equipment measures instantaneously the whirling speed of the funnel.

David W. Holmes and Robert L. Smith of the U. S. Weather Bureau, Washington, D.C., said that by making use of the Doppler effect they were able to detect what they assumed to be "tornadic activity." The Doppler effect is the shortening or stretching of the radar beam wavelength as it bounces back from the funnel. When the funnel spin is in the direction of the radar receiver, the wavelength is shortened, and vice versa. The amount of change in the wavelength indicates the speed of spin.

Mr. Holmes and Mr. Smith tested their equipment in tornado territory of Texas and Kansas. They believe that with some modifications it will "improve our ability to prevent the loss of life due to these storms."

Science News Letter, November 29, 1958


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CE FIELDS

PHYSICS

H-Bomb Explosion Causes Artificial Aurora

➤ A HYDROGEN BOMB exploded high in the air can cause a bright artificial aurora.

The man-made auroral display was seen by J. G. Keys, observer-in-charge at Apia Observatory, New Hebrides Islands, at 10:51 Greenwich Time on Aug. 1. At the same time there was a sudden increase in magnetic activity at Apia.

A hydrogen bomb was exploded by U. S. scientists high in the upper atmosphere over Johnston Island at approximately the time the aurora appeared and the magnetic disturbance started.

Auroras are rarely seen in tropical regions, and only one other has been reported at Apia, on May 13 to 16, 1921. Those auroras that are seen in the tropics have always been associated with severe world-wide magnetic disturbances.

However, the Apia disturbance definitely was not world-wide, Dr. A. L. Cullington of New Zealand's Department of Scientific and Industrial Research reports in *Nature* (Nov. 15).

Therefore, Dr. Cullington concludes:

"There seems to be little doubt that the unusual magnetic effects recorded at Apia are related to this explosion and that the manifestation seen at Apia was a man-made or artificial aurora due to a nuclear explosion in the upper atmosphere."

Since a study of the effects due to this explosion may help understanding of the theory of magnetic storms and auroras, Dr. Cullington asked other stations in the Central Pacific to search their records for abnormal magnetic activity at the time.

Science News Letter, November 29, 1958

EDUCATION

Bent to Science Starts In Home Before School

➤ WHAT HAPPENS to a child while being raised in the home long before school days may determine whether he is likely to be a scientist or go into some other life work, persons at the Edison Foundation Conference in Cincinnati learned.

Dr. Anne Roe, adjunct professor of psychology, New York University, finds the differences that make most people interested in things and other people most interested in people stem from the earliest experiences in infancy. The "thing" persons can become scientists and the "people" persons develop toward non-science fields.

Parents who want to raise their children to be scientists, Dr. Roe advises, should refrain from:

Treating them as overprotected "mothers' children," giving them everything they want.

Suppressing natural curiosity by overprotection, such as stopping the handling of things around the house due to fear of breaking.

Not letting them follow the interests that develop from things attracting them naturally.

While basic orientations toward science and non-science do begin almost in the cradle, schools do have a chance to reinforce science motivation and give essential training, Dr. Roe emphasized. They can also direct the attention of those who have basic abilities to the advantages of science careers.

Science education needs to do more than discipline minds and impart facts, Dr. Roe believes. It is necessary to urge the potential scientist to give free play to fancy and also be respectful of the method and spirit of inquiry.

Science News Letter, November 29, 1958

PHYSIOLOGY

Low Temperatures Lessen Kidney's Blood Flow

➤ PROGRESSIVE induced reduction in body temperature probably causes a parallel decrease in the kidney's blood flow and glomerular filtration rate.

This was reported by Dr. John H. Moyer of the Hahnemann Medical College in Philadelphia at a conference on hypothermia sponsored by the New York Academy of Sciences. Hypothermia refers to body temperatures less than the normal.

Despite the decrease in glomerular filtration and renal blood flow during subnormal temperatures, Dr. Moyer said, there is not a similar decrease in urine volume or sodium excretion until the body is brought to temperatures below 26 degrees centigrade (about 79 degrees Fahrenheit). Below this point urine volume and sodium excretion diminish progressively with temperature reduction.

Reduction in kidney function is probably not a result of the decrease in blood pressure concomitant with hypothermia, since raising the blood pressure with a special agent does not affect the altered kidney function.

In another report to the conference, Dr. Ralph W. Brauer of the Naval Radiological Defense Laboratory in San Francisco told how circulation in the liver is altered in hypothermia. This is due to increased blood viscosity and to a fluid shift from extracellular to intracellular resulting in increased liver volume.

Effects on the functional elements of the liver, said Dr. Brauer, include changes in secretory activity such as a sharp reduction in bile flow.

Dr. Robert M. Berne of Western Reserve University in Cleveland reported on the effect of hypothermia on the functions of the heart. Contractility or myocardial heart tissue is not impaired in hypothermia, he said. On the other hand, both the oxygen consumption of the heart and coronary resistance were found to be reduced in hypothermia. The reduction in coronary resistance may be due to a direct effect of cold on the coronary vessels.

Science News Letter, November 29, 1958

MEDICINE

Blood in the Eye Removed by Heart Drug

➤ A DRUG used to treat certain heart conditions can help remove damaging blood from the eye.

This is reported by Dr. Robert Sinskey, University of California at Los Angeles Medical School, who has been studying eye hemorrhages know as hyphemias.

A hyphemia is a hemorrhage into the anterior chamber of the eye, which lies between the iris and cornea. Hyphemias often occur when an object, such as a ball, hits the eye, or following certain types of eye surgery. If the blood remains in the chamber for a long period of time, serious damage to the eye may result.

Dr. Sinskey was able to trace the course of the blood in the eye by tagging red blood cells with radioactive isotopes. He found the red cells can leave the chamber as whole red cells without hemolyzing or breaking up first. They leave in large numbers in the first two hours after the hemorrhage but slow down their rate of exit considerably after that.

He also found intravenous injections of Diamox, a drug used to treat certain heart conditions, increases the rate at which the blood leaves the chamber by 21% over untreated control rabbits with hyphemias. The reason Diamox works is unknown as yet.

As a result of these findings, Diamox is being used clinically to treat hyphemias. Drugs which have been used to treat hyphemias by dilating or narrowing the pupils of the eye were found not to influence the rate at which blood leaves the eye.

Science News Letter, November 29, 1958

GEOGRAPHY

Sahara-Like Desert Exists in South America

➤ A DESERT in South America with moving sand dunes reminiscent of the Sahara is described by Dr. Raymond E. Crist of the University of Florida in a report to the Smithsonian Institution.

There, only a little over 50 miles from bustling, modern, oil-rich Maracaibo, Venezuela, people live today very much as they did on the Old World desert of Arabia in the days of Abraham.

Although an international boundary runs through this desert of Guajira, the Venezuelan and Colombian governments that technically have jurisdiction have been forced to recognize local laws and customs and to grant a high degree of local cultural autonomy.

The people continue to be Guajiros, speaking their own language, wearing their own dress, and living their own nomadic life.

As in most arid lands, rights to water are more important than rights to land. And, as in the Sahara or in the Arabian Desert, a large part of the life of the people is carried on around wells or waterholes. People come to "casimbas," as they are known, in a constant stream from many kilometers in all directions.

Science News Letter, November 29, 1958

ASTRONOMY

Winter Stars Shine

The December skies offer the astronomer much to observe: the brilliant planet Mars, several prominent constellations and the Geminid shower of meteors.

By JAMES STOKLEY

➤ ALTHOUGH RAPIDLY drawing away from us, the planet Mars is still conspicuous in the southern evening sky.

From a distance of about 49,700,000 miles on Dec. 1, it recedes to 67,200,000 miles at the end of the month. At the same time it drops in brightness a full magnitude, on the astronomer's brightness scale; that is, about 40% of what it was Dec. 1. But even then it will shine more brilliantly than all but one of the stars now visible.

The accompanying maps show the skies' appearance at about 10 p.m., standard time, on the first of December. By the middle of the month they will look this way at about 9:00 p.m. and at the end they will have the same appearance at eight o'clock. Mars is high in the south, in the constellation of Aries, the ram.

Toward the east and southeast is a group of prominent constellations, containing many bright stars, that will be high in the south on midwinter evenings. This group is responsible for the brilliance of the winter skies.

Hyades and Pleiades

To the left of Mars stands Taurus, the bull, with a first-magnitude star that is distinctly red in color, named Aldebaran. This is part of a smaller, V-shaped, group of stars called the Hyades. Higher and to the right of the Hyades there is another and more compact cluster called the Pleiades. Here six stars can normally be seen with the naked eye, but use of a pair of binoculars will reveal many more.

Below and to the left of Taurus is one of the most prominent of all constellations. This is Orion, the only constellation visible from the United States that contains two stars of the first magnitude. These are Betelgeuse and Rigel, whose positions are shown on the map. Between them are three stars in a row that form the belt of the warrior, the figure that the stars of Orion were supposed to form, as depicted on old star maps.

Low in the southeast and east are two star groups representing Orion's dogs. Canis major, the greater dog, is now rather low, but the star Sirius, which is in this constellation, shines brightly. This is the one star that exceeds the end-of-the-month brightness of Mars. However, when Sirius is as low as it is shown here its brightness is somewhat dimmed by the amount of atmosphere that its light has to penetrate. When it is higher in the sky, it has a shorter path through the earth's layer of air, so there is less absorption.

The other dog is the lesser one, Canis Minor. In it is the star called Procyon. Above it, partly on the map of the northern sky, partly on the southern, are Gemini, the twins. The two bright stars here are Castor and Pollux, the latter the brighter. Still higher in the northeast, is Capella in the constellation of Auriga, the charioteer. And overhead, at the times for which the maps are drawn, is Perseus, the champion, a constellation which includes the famous variable star Algol. Its light is dimmed every few days as a darker companion passes in front of the brighter component, and causes a partial eclipse.

In the northwest there are still visible two stars that were prominent on summer evenings; like Sirius, they are dimmed by reason of their low altitude. Just above the horizon is Vega, all that is shown of Lyra, the lyre. Above it is Cygnus, the swan, in which Deneb is the brightest star.

Another planet, Venus, is just coming into the evening sky. At the end of December it sets nearly an hour after the sun. It may be seen near the southwestern horizon as dusk is falling.

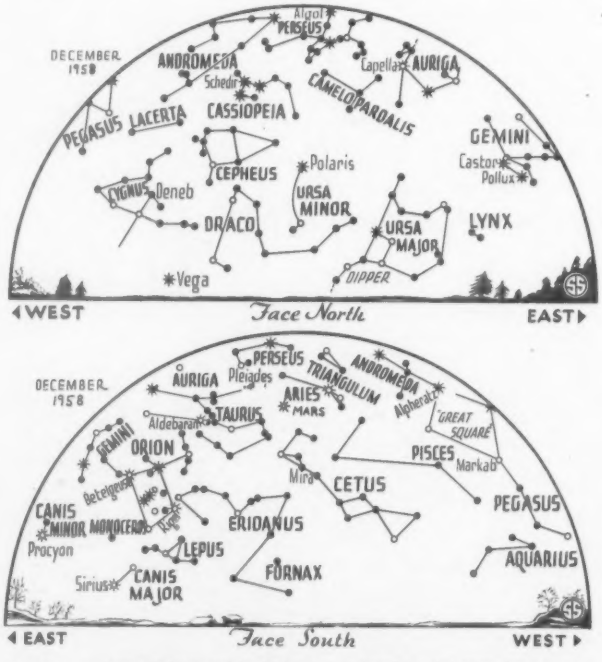
In the early morning, just before sunrise, Jupiter may be seen low in the southeast. It is nearly as bright as Mars is at the beginning of the month.

Mercury, on Dec. 29, will be at the position called "greatest western elongation," when it is farthest west of the sun, and rises well before sunrise. About that time, it is possible to glimpse it also in the southeast, as dawn is breaking. Saturn cannot be seen at all in December; on the 20th it is in the same direction as the sun, far out beyond it.

The name "planet" really means a wanderer. They were so-called in ancient time when men noticed that, unlike the stars, which seem to remain in the same relative positions, they move around among the constellations.

Actually the stars also are moving, and some at high speeds, but they are at such vast distances that even a whole lifetime is not enough to show a perceptible change as seen with the naked eye. From accurate astronomical measurements, however, their motions across the sky have been determined. Because of these movements, the constellation figures are all changing. Fifty thousand years ago they looked very different, to the primitive cave men in Europe and other parts of the world, from the appearance they present today. And 50,000 years hence, our descendants will see them still differently. Orion, the great dipper, Taurus and all our familiar groups, will be gone completely, superseded by entirely different configurations.

The sun is also a star, the nearest of all, and it, too, is moving through space, in the general direction of the star Vega. But as it goes, at a speed of about 12 miles per second, it carries the earth, as well as the other planets, along with it. Therefore it is not entirely correct to say, as we often do, that the path of the earth is an ellipse,



☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

nearly circular. Actually we are moving in a helix, a three-dimensional figure like that of a spring, or a corkscrew. However, relative to the sun, the paths of the planets are ellipses.

Mercury, innermost planet, travels around the sun most rapidly, at a speed averaging nearly 30 miles per second, while Pluto, most distant, has an orbital velocity of a little less than three miles per second. The earth's speed is 18.5 miles per second, and that of Mars slightly more than 15.

Because of this, the apparent motions of the planets in the sky, against the background of distant stars, is a combination of their movement and ours.

"Retrograde" Mars

On Oct. 1, Mars was close to the Hyades, the little group in Taurus in which Aldebaran is found. Now it is well over towards Aries. That is, apparently it has been moving toward the west, although actually all the planets move around the sun in an easterly direction. Now, since the earth has gone past, Mars will cease this backward, or "retrograde," movement. On Dec. 20, it will be stationary; after that it will resume its "direct" motion, toward the east.

About Dec. 13, there will be a favorable opportunity, if the skies are clear, to observe meteors, or "shooting stars," of the Geminid shower. They will be seen to best advantage after midnight, when perhaps as many as 40 an hour may be detected. These will seem to radiate from the constellation of Gemini, hence the name. Actually, these meteors, which are not much larger than grains of sand, are moving in parallel paths around the sun in a huge swarm, which we encounter every December. Sometimes the bright moon may interfere with them. This month, however, the moon is new only three days before the date of the maximum. It will therefore set early in the evening, and be well out of the way before the hours when the Geminids are at their best.

Celestial Time Table for December

Dec.	EST	
2	9:43 p.m.	Algol (variable star in Perseus) at minimum brightness.
3	8:24 p.m.	Moon in last quarter.
8	7:00 p.m.	Moon nearest, distance 224,600 miles.
9	10:00 p.m.	Mercury in inferior conjunction (between earth and sun).
10	12:23 p.m.	New moon.
13	early a.m.	Meteors of Geminid shower visible.
17	6:52 p.m.	Moon in first quarter.
20	2:38 a.m.	Algol at minimum.
	7:00 a.m.	Saturn in same direction as sun.
	4:00 p.m.	Moon farthest, distance 251,600 miles.
21	11:56 p.m.	Moon passes Mars.
22	3:40 a.m.	Winter solstice—winter begins in Northern Hemisphere.
	11:27 p.m.	Algol at minimum.
25	8:16 p.m.	Algol at minimum.
	10:54 p.m.	Full moon.
29	9:00 a.m.	Mercury farthest west of sun —visible low in southeast just before sunrise for a few days about now.

Subtract one hour for CST, two hours for MST, and three for PST.

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AIR POLLUTION EFFECTS OF IRRADIATED AUTOMOBILE EXHAUST AS RELATED TO FUEL COMPOSITION—E. A. Schuck, H. W. Ford, and E. R. Stephens—*Air Pollution*, 91 p., illus., paper, $3. Study showed that regulation of the composition of automotive fuels is an unpromising approach to the problem of urban air pollution.

CHEMICAL TRANSFORMATIONS BY MICROORGANISMS—Frank H. Stodola—*Wiley*, 134 p., $4.25. On the chemical composition of microorganisms, the organic type reactions they carry out and their synthetic powers.

THE CHEMISTRY AND TECHNOLOGY OF LEATHER, Vol. II: Types of Tannages—Fred O'Flaherty, William T. Roddy and Robert M. Lollar, Eds.—*Reinhold*, 554 p., illus., $16.50. Monograph on the chemistry, processing and mechanism of tannery.

CIVIL AIR REGULATIONS AND FLIGHT STANDARDS FOR PILOTS—*Aero Publishers*, 20th ed., 160 p., illus., paper, $2.25. Air laws, flight rules, licensing requirements and instructions for student pilots.

CONTRIBUTIONS OF THE PHYSICAL, BIOLOGICAL, AND PSYCHOLOGICAL SCIENCES IN HUMAN DISABILITY—Renato Contini, Ed.—*N.Y. Acad. of Sciences*, Annals, Vol. 74, Art. 1, 160 p., illus., $3.50. Report on interdisciplinary research.

DEMOGRAPHIC YEARBOOK 1957—*United Nations (Columbia Univ. Press)*, 9th ed., 656 p., $8, paper $6.50. Special subject of this volume is mortality statistics.

EXPLORERS' MAPS: Chapters in the Cartographic Record of Geographical Discovery—R. A. Skelton—*Praeger*, 337 p. 200 maps, $12.50. Pictorial history of exploration, originally written for *The Geographical Magazine*, London.

THE FUNDAMENTAL PRINCIPLES OF QUANTUM MECHANICS WITH ELEMENTARY APPLICATIONS—Edwin C. Kemble—*Dover*, new ed., 611 paper, $2.95. Unabridged and corrected reprint of 1937 edition.

FUNDAMENTALS OF TRANSISTORS—Leonard M. Krugman— *Rider*, rev. ed., 164 p., illus., paper, $3.50. For the technician and the amateur.

THE GOLDEN GEOGRAPHIC ENCYCLOPEDIA—Theodore Shabad and Peter M. Stern, Eds., compiled by Erich Kaden and others—*Simon & Schuster*, 228 p., 450 maps and color photographs, $7.95. Adapted from the German *Westermann Bildkarten Lexikon*.

THE GREY SEAS UNDER—Farley Mowat—*Little*, 341 p., $5. Story of fifteen years of rescue work of a small salvage tug in the North Atlantic.

GUIDE TO ROCKETS, MISSILES, AND SATELLITES—Homer E. Newell, Jr.—*Whittlesey House*, 54 p., illus., $2.50. Brief review of the high-speed weapons and vehicles that are either in existence or under development.

HANDBOOK OF CARDIOLOGY FOR NURSES—Walter Modell and Doris R. Schwartz—*Springer Pub.*, 3rd ed., 328 p. $4.50. Revision includes new drug therapy and latest techniques of cardiac surgery.

HANDBOOK OF RESPIRATION—Philip L. Altman, John F. Gibson, Jr., and Charles C. Wang—*Saunders*, 403 p., paper, $7.50. Prepared under the direction of the Committee on the Handbook of Biological Data, National Academy of Sciences-National Research Council.

A HIVE OF BEES—John Crompton—*Doubleday*, 180 p., illus. by A. E. Bestall, $3.75. A mixture of experiences, impressions, and speculations as well as facts about bees.

THE IMPENETRABLE SEA—Arthur Constance—*Citadel*, 279 p., illus., $4. On the wonders of the sea, of winds, whirlpools, coastlines, whales and plankton.

AN INTRODUCTION TO FOURIER METHODS AND THE LAPLACE TRANSFORMATION—Philip Franklin—*Dover*, new ed., 289 p., paper, $1.75. Unabridged reprint of *Fourier Methods*, first published in 1949.

LIGHT—Alexander Efron—*Rider*, 127 p., illus., paper, $2.25. Introduces general reader to the phenomena of reflection, refraction, nature and spectrum of light waves with chapter on optical instruments.

LOGIC MACHINES AND DIAGRAMS—Martin Gardner—*McGraw*, 157 p., illus., $5. Traces the history of logic devices and projects their future.

MODERN SCIENCE QUIZ BOOK—Anne Orth Epple and Lewis E. Epple, Jr.—*Platt*, 54 p., illus.,$1.50. 650 questions and answers in various fields of science. Ages 10 to 16.

RESEARCH IDEAS FOR YOUNG SCIENTISTS—George Barr—*Whittlesey House*, 142 p., illus. by John Teppich, $3. Leads children to observe and do their own experiments at home without laboratory equipment.

SPACE SATELLITE: The Story of the Man-Made Moon—Lee Beeland and Robert Wells, preface by John P. Hagen—*Prentice-Hall*, rev. ed., 78 p., illus. by Jack Coggins, $2.95. Popular explanation of the principles of rocketry and the Minitrack tracking system.

SOVIET WRITINGS ON EARTH SATELLITES AND SPACE TRAVEL—Ari Sternfeld and others—*Citadel*, 253 p., illus., $3.95. Collection of Russian stories on space science and the three sputniks, in English.

SPACE TRAVEL—Willy Ley— *Guild Press, (Simon & Schuster)*, 44 p., illus. by John Polgreen, $1. Fourth and last of Adventure in Space series.

STRUCTURAL CONVERSIONS IN CRYSTALLINE SYSTEMS AND THEIR IMPORTANCE FOR GEOLOGICAL PROBLEMS — Wilhelm Eitel — *Geological Soc. of Am.*, 183 p., illus., $3. Monograph on the results of research in structural conversions.

THE STRUCTURE OF ARITHMETIC AND ALGEBRA—May Hickey Maria—*Wiley*, 294 p., $5.90. Fundamental concepts explained for the non-science student and the teacher of secondary school mathematics.

THINK, MR. PLATYPUS—Anita Hewett—*Sterling*, 32 p., illus. by Anne Marie Jauss, $2.50. Easy-to-read children's book about the habits of platypuses.

TRENDS IN GENETIC ANALYSIS—G. Pontecorvo—*Columbia Univ. Press*, 145 p., illus., $4. Course of lectures reappraising the theory of the gene.

THE TWO ENDS OF THE LOG: Learning and Teaching in Today's College—Russell M. Cooper, Ed.—*Univ. of Minn. Press*, 317 p., $4. Based on papers presented at a conference on col-

(Continued on page 350)

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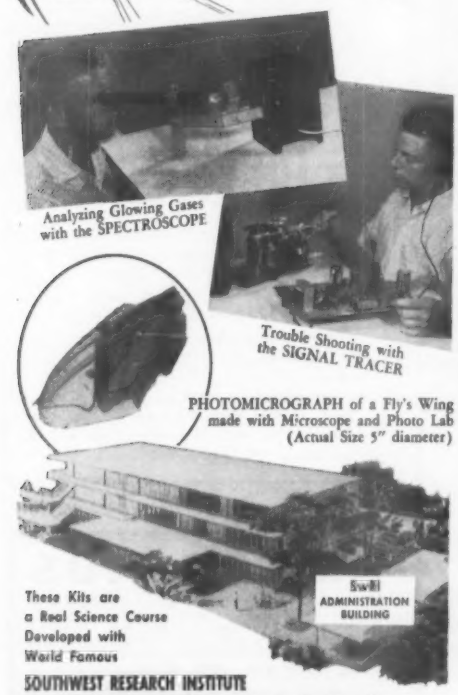

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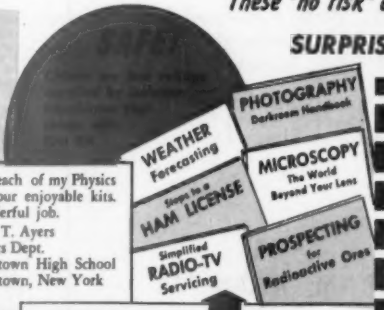

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Books of the Week

(Continued from page 348)

lege teaching, with chapter on challenging the gifted student.

WHO'S WHO IN WORLD AVIATION AND ASTRONAUTICS—Marion E. Grambow, Ed.—*Am. Aviation Publications*, 2nd ed., 497 p., $12.50. More than 3000 short biographical entries.

WILDLIFE AT YOUR DOORSTEP—Glen Rounds—*Prentice-Hall*, 115 p., illus. by author, $3. An illustrated almanac of curious doings, dealing with wasps, spiders, toads, birds and other kinds of small wildlife.

WORLD HEALTH—Fraser Brockington—*Penguin*, 405 p., paper, 95¢. Explains the problems of food, population, disease and social welfare that the World Health Organization is seeking to solve.

YOUR CHILD'S WORLD: From Infancy Through Adolescence—Robert P. Odenwald—*Random House*, 211 p., $3.50. Written especially for Catholic parents.

Science News Letter, November 29, 1958

Questions

ASTRONAUTICS—What differences in dental health have been found in submarine crews and regular ships' crews? p. 339.

CHEMISTRY—What dyes are being used in an organic solar battery? p. 341.

PHYSIOLOGY—What relationship has been found between schizophrenia and cerebrospinal fluid? p. 344.

Photographs: Cover, U.S. Bureau of Reclamation; p. 339, National Cash Register Company; p. 341, Massachusetts Institute of Technology; p. 352, Dow Corning.

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WHO IS EDMUND C. BERKELEY? Author of "Giant Brains or Machines That Think," Wiley, 1949, 270 pp. (13,000 copies sold); author of "Computers: Their Operation and Applications," Reinhold, 1956, 366 pp.; Editor & Publisher of the magazine, *Computers and Automation;* Maker and Developer of small robots; Fellow of the Society of Actuaries; Secretary (1947-53) of the Association for Computing Machinery; Designer of all the Tyniacs and Brainiacs, more than half of the 33 Geniacs (1955); Designer of the Multiple Switch Disc and other features in the 1955 Geniac kit.

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- Manual "Tyniacs: Small Electric Brain Machines and How to Make Them" by Edmund C. Berkeley, 1956, 48 pages—includes Introduction to Boolean Algebra for Designing Circuits.
- "How to Go from Brainiacs and Geniacs to Automatic Computers" by Edmund C. Berkeley.
- Dr. Claude E. Shannon's historic 1938 paper given before the American Institute of Electrical Engineers: "A Symbolic Analysis of Relay and Switching Circuits," 12 pages.
- List of references to computer literature including "Minds and Machines" by W. Sluckin, published by Penguin Books (Baltimore), 1954, 233 pages and other references.

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Science News Letter, November 29, 1958

⚙ *CORRUGATED STEEL ROLL ROOFING has instructions for making a tight roof printed right on the metal. It comes in 31-foot-long rolls and can be rolled on the roof purlins by two men. A printed gauge line assures that the right lap is made for each strip. A scored groove in the crimped edge impresses itself into the mastic sealer when nailed.*

Science News Letter, November 29, 1958

⚙ *WIRE-FORMING TOOL bends, straightens and cuts any size wire up to 5/32-inch diameter in any metal material. Made of cold rolled steel, the tool will make various wire items. Pressure of one finger on the plastic handle bends the average wire smoothly and to accurate dimensions.*

Science News Letter, November 29, 1958

⚙ *BRICK TREATMENT controls unsightly green or white stains appearing on masonry walls. Immediately after leaving the kiln, each brick, such as the one shown*

in the photograph, is dipped or sprayed with an alkaline salt solution of an organo-silanol compound. This bonds an invisible silicone deposit to the pore surfaces of the brick which causes the brick to shed water instead of absorbing it.

Science News Letter, November 29, 1958

⚙ *ALUMINUM RADAR TARGET for small craft reflects radar beams seven miles directly back to the transmitter, regardless of direction. Even small wooden boats, which otherwise do not reflect radar waves, acquire bright radar visibility with the two-and-a-half-pound target.*

Science News Letter, November 29, 1958

⚙ *DISTILLATION UNIT produces sterile, pyrogen-free water from ordinary boiler steam. Operation is continuous and completely automatic; no flushing or deconcentration is necessary. The process includes steam reception, centrifugal separation, vapor-liquid separation, condensation, degassing and discharge.*

Science News Letter, November 29, 1958

⚙ *THERMAL RIBBON for temperature measurement and control applications to 260 degrees centigrade is flexible and less than .02 inch thick. It has a pressure-sensitive tape for installation to flat, curved or irregular surfaces. A calibration curve converts resistance measurements to temperature.*

Science News Letter, November 29, 1958

⚙ *PLEXIGLAS STRING MODELS, used as visual aids in mathematics, science and engineering, facilitate instruction in geometrical relationships and space configurations. The models average about seven to nine inches in height. Some of the models have movable cutting planes.*

Science News Letter, November 29, 1958

Nature Ramblings

By BENITA TALL

Hear Ye! Hear Ye!

➤ IT IS TOO bad that the town crier still does not walk through the town or city, telling the news and urging the neighbors to "Hear ye! Hear ye!" His cry would remind us of something we tend simply to accept without full appreciation: the sense of hearing.

Some sounds give us pleasure, the enjoyment of conversation or of music. Other sounds warn of danger. Thousands of others fit in a kind of neutral ground of sounds that is part of a person's daily life.

We know something about the mechanics of hearing. Man and other mammals, including the whales, all birds and the crocodiles, have a three-part ear: the outer, middle and inner ear. Hearing is achieved through a complicated transmission involving bones, liquid in the inner ear, sensory hairs and nerve pathways.

We also know something of the immense range of hearing sensitivity. A dog will respond to sounds considerably higher than a

man can hear. Other animals have a greater or lesser degree of sensitivity, responding to a wider or narrower range of sound frequencies and intensities than man. Yet for the scientist there is much about hearing that is unknown.

When studies of hearing in animals are mentioned, bats are probably the first animal that comes to mind.

Because of the bat's unusual use of sound to avoid obstacles, scientists have been able to test the bat's responses to sound and correlate them with the animal's physical characteristics, its environment and so on. Horseshoe bats are even said to use their ear flaps to help detect objects. The flaps apparently are in constant motion in a complicated pattern of movement that seems to scan the area "illuminated" by the beam of sound the bat emits.

To complicate the scientist's investigations of the ear and hearing further, there are other kinds of "ears." Insects have what are called chordotonal organs. Some of these sense organs have the unique function of helping the insect in its egg-laying. Some parasitic wasps that can plant their eggs in a saw-fly larva through half an inch of wood apparently are aided by the sound-sensitive organs located in their legs.

How these many sound organs function, the role of sound in encouraging or barring inter-species mating, in animal communication or in various warning and survival mechanisms, and the immense variation in hearing sensitivity from individual to individual are but a few of the "hearing problems" facing the scientist.

Science News Letter, November 29, 1958